

[STRUCTURE FOR MEASUREMENT OF CAPACITANCE OF ULTRA-THIN DIELECTRICS]

Abstract

Disclosed is an on-chip test device for testing the thickness of gate oxides in transistors. A ring oscillator provides a ring oscillator output and an inverter receives the ring oscillator output as an input. The inverter is coupled to a gate oxide and the inverter receives different voltages as power supplies. The difference between the voltages provides a measurement of capacitance of the gate oxide. The difference between the voltages is less than or equal to approximately one-third of the difference between a second set of voltages provided to the ring oscillator. The capacitance of the gate oxide comprises the inverse of the frequency of the ring oscillator output multiplied by the difference between the voltages, less a capacitance constant for the test device. This capacitance constant is for the test device alone, and does not include any part of the capacitance of the gate oxide. The measurement of capacitance of the gate oxide is used to determine the thickness of the gate oxide.